

CLAIMS

What is claimed is:

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Chillian III

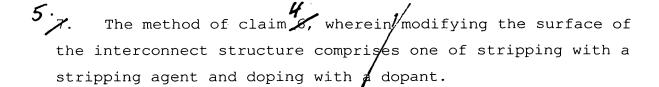
A method comprising:

introducing a portion of an interconnect structure in an opening through a dielectric over a contact point; and introducing a conductive shunt material adjacent the portion of the interconnect structure through a chemically-induced oxidation-reduction reaction.

- 2 The method of claim 1, wherein introducing the shunt material comprises introducing a shunt material precursor in the presence of a reducing agent.
- 3. The method of claim 2, wherein the reducing agent comprises an alkaline metal-free material.
- 4. The method of claim 2, wherein introducing the shunt material precursor comprises introducing the shunt material precursor in the presence of a non-metallic chelating agent.
- 5. The method of claim 1, further comprising:
 introducing the shunt material in an alkaline
 environment with a pH adjusted by an alkaline metal-free pH
 adjuster.
- 6. The method of claim 1, further comprising:

 prior to introducing the shunt material, modifying the exposed surface of the interconnect structure.





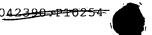
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- 8. The method of claim 1, wherein introducing the interconnect structure comprises introducing a barrier material and an interconnect material, and the introduction and reduction of the shunt material precedes the introduction of the interconnect material.
- 9. The method of claim 8, wherein introducing the interconnect structure further includes introducing a seed material following the introduction of the barrier material.
- 10. The method of claim 8, wherein the opening through the dielectric material comprises a via having a cross-sectional area and a volume, and a trench to the via having a cross-sectional area greater than the cross-sectional area of the via, and introducing the shunt material comprises introducing the shunt material to substantially fill the volume of the via.
- 11. The method of claim 2, wherein introducing the shunt material comprises:

placing a substrate comprising the interconnect structure in a bath comprising the shunt material precursor.

The method of claim 11, further comprising, prior to placing the substrate in the bath, protecting a portion of the substrate to exposure to the components of the bath.





13. The method of claim 2, wherein introducing the shunt material comprises:

dispensing the shunt material precursor onto the interconnect structure.

The method of claim 2, wherein introducing the shunt 14. material comprises:

placing a substrate comprising the interconnect structure in a wafer scrubber; and

while in the wafer scrubber exposing the interconnect structure to the shunt material precursor.

A method comprising: 15.

introducing an interconnect structure in an opening through a dielectric over a contact point;

introducing a conductive shunt material having an oxidation number over an exposed surface of the interconnect structure; and

reducing the oxidation number of the shunt material.

- The method of claim 15, further comprising prior to 16. reducing the oxidation number of the shunt materia. introducing a reducing agent.
- 15. The method of claim 16, wherein the reducing agent comprises an alkaline metal-free material.
 - The method of claim 15, further comprising:

reducing the oxidation number of the shunt material in the presence of a non-metallic chelating agent.

The method of claim 15, further comprising: 19.





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reducing the oxidation number of the shunt material in an alkaline environment.

20. The method of claim 15, further comprising:

prior to introducing the shunt material, modifying the exposed surface of the interconnect structure.

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of the interconnect comprises one of stripping with a stripping agent and doping with a dopant.

- 22. The method of claim 15, wherein introducing the interconnect structure comprises introducing a barrier material and an interconnect material, and the introduction and reduction of the shunt material precedes the introduction of the interconnect material.
- 23. The method of claim 22, wherein introducing the interconnect structure further includes introducing a seed material following the introduction of the barrier material.
- 24. The method of claim 22, wherein the opening through the dielectric material comprises a via having a cross-sectional area and a volume, and a trench to the via having a cross-sectional area greater than the cross-sectional area of the via, and introducing the shunt material comprises introducing the shunt material to substantially fill the volume of the via.
- 25. An apparatus comprising: a substrate comprising a device having contact point;

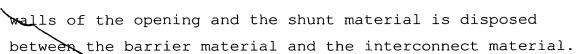


a dielectric layer overlying the device with an opening to the contact point; and

an interconnect structure disposed in the opening comprising an interconnect material and a different conductive shunt material.

- 26. The apparatus of claim 25, wherein the shunt material overlies the interconnect material.
- 27. The apparatus of claim 26, wherein the dielectric layer is a first dielectric layer, and further comprising a second dielectric layer with an opening to the shunt material.
- 28. The apparatus of claim 25, wherein the interconnect structure comprises a barrier material disposed along side walls of the opening and the shunt material is disposed between the barrier material and the interconnect material.
- 29. The apparatus of claim 28, wherein the interconnect structure comprises a seed material and the shunt material is disposed between the seed material and the interconnect material.
- 30. The apparatus of claim 25, wherein the opening through the dielectric material comprises a via having a cross-sectional area and a volume, and a trench to the via having a cross-sectional area greater than the cross-sectional area of the via, and the shunt material substantially fills the volume of the via.
- 31. The apparatus of claim 30, wherein the interconnect structure comprises a barrier material disposed along side





32. The apparatus of claim 25, wherein the conductive shunt material comprises one of cobalt and a cobalt alloy.